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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,008	07/05/2001	Paul Anuzis	110023	1652

25944 7590 04/11/2003

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EXAMINER

LE, TOAN M

ART UNIT	PAPER NUMBER
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2863

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/898,008

Applicant(s)

ANUZIS ET AL.

Examiner

Toan M Le

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 19-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. **Claims 1-18**, drawn to data processing: vibration detection, classified in **class 702, subclass 56**.
 - II. **Claims 19-21**, drawn to calibration or correction system: timing (e.g., delay, synchronization), classified in **class 702, subclass 89**.
2. Inventions **I** and **II** are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because any method and data processing system for synchronizing two or more data streams can be used with **I**. The subcombination has separate utility such as adjusting a timer or for correcting a timing-related error in the measurement data.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are distinct for the reasons given above and the search required for **Group I** is not required for **Group II**, restriction for examination purposes as indicated is proper.

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5. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

7. During a telephone conversation with David Cho on 4/4/03 a provisional election was made with traverse to prosecute the invention of **I, claims 1-18**. Affirmation of this election must be made by applicant in replying to this Office action. **Claims 19-21** are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hussein.

Referring to claim 1, Hussein discloses a method for monitoring the health of a system, which comprises performing at each of a plurality of times the steps of: constructing a condition

signature from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from the system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from the system (col. 16, lines 12-14; col. 25, lines 7-8; and col. 26, lines 14-15; figure 11); predicting a normal signature from a model defining one or more inter-dependencies between the condition indicators, the normal signature corresponding to a condition signature for a healthy system (col. 25, lines 44-52; and col. 26, lines 25-30; figure 4); comparing the condition signature with the normal signature; and registering an event if the condition signature differs from the normal signature by more than a predetermined threshold (col. 25, lines 9-17; and col. 26, lines 31-34; figure 14A).

As to claims 2, 5, 10, and 13, Hussein discloses a method for monitoring the health of a system, wherein the model is a learnt model comprising a neural network (col. 28, lines 51-54; figure 11).

Referring to claim 3, Hussein discloses a method for monitoring the health of a system, wherein the model comprises a matrix with one or more non-zero off-diagonal terms to define the interdependencies (col. 8, lines 25-27; col. 11, lines 53-67; and col. 25, lines 50-52).

As to claims 4 and 12, Hussein discloses a method for monitoring the health of a system, wherein the steps of comparing the condition signature with the normal signature involves calculating a value for the normalized innovations squared (col. 20, line 60).

Referring to claims 6 and 14, Hussein discloses a method for monitoring the health of a system, wherein the steps of comparing the condition signature with the normal signature involves calculating a prediction error (col. 12, lines 24-27; figure 4).

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As to claim 7, Hussein discloses a method for monitoring the health of a system, wherein the times define successive intervals of at most 1 sec duration (col. 20, line 35; and col. 28, lines 12-13; figure 3).

Referring to claim 8, Hussein discloses a method for monitoring the health of a system, which comprises performing at each of a plurality of times defining successive intervals of at most 1 sec duration (col. 20, line 35; and col. 28, lines 12-13) the steps of: constructing a condition signature from a plurality of condition indicators including (a) a plurality of vibration measurements acquired from the system or (b) one or more vibration measurements and one or more performance parameter measurements acquired from the system (col. 16, lines 12-14; col. 25, lines 7-8; and col. 26, lines 14-15; figure 11); predicting a normal signature corresponding to a condition signature for a healthy system (col. 25, lines 44-52; and col. 26, lines 25-30; figure 4); comparing the condition signatures with the normal signature; and registering an event if the condition signature differs from the normal signature by more than a predetermined threshold (col. 25, lines 9-17; and col. 26, lines 31-34; figure 14A).

As to claims 9 and 11, Hussein discloses a method for monitoring the health of a system, which comprises performing at each of a plurality of times defining successive intervals of at most 1 sec duration, wherein the normal signature is predicted from a model comprising a matrix with one or more non-zero off-diagonal terms defining one or more inter-dependencies between the condition indicators (col. 8, lines 25-27; col. 11, lines 53-67; and col. 25, lines 50-52).

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Referring to claim 15, Hussein discloses a method for monitoring the health of a system, wherein the measurements are synchronously acquired from the system to a synchronization imprecision of at most 1 sec (col. 20, lines 35-36).

As to claim 16, Hussein discloses a method for monitoring the health of a system, wherein the system comprises a gas turbine engine (col. 4, lines 47-49).

Referring to claims 17-18, Hussein discloses a data processing system for monitoring the health of a system, comprising: data acquisition means 830 (figure 11) for acquiring a plurality of condition indicators from the system at each of a plurality of times defining successive intervals of at most 1 sec duration, the condition indicators including (a) a plurality of vibration measurements or (b) one or more vibration measurements and one or more performance parameter measurements (col. 16, lines 12-14; col. 25, lines 7-8; and col. 26, lines 14-15); processor means 831 (figure 11) for constructing a condition signature from the condition indicators and for predicting a normal signature corresponding to a condition signature for a healthy system, the normal signature being predicted by a model which defines one or more inter-dependencies between the condition indicators (col. 25, lines 9-15; and col. 11, lines 53-67); comparator means 832 (figure 11) for comparing the condition signature with the normal signature; and registration means 835 (figure 11) for registering an event if the comparator indicates that the condition signature differs from the normal signature by more than a predetermined threshold (col. 25, lines 16-20).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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U.S. Patent No. 5,847,658 to Irie et al.

U.S. Patent No. 5,995,910 to Discenzo

U.S. Patent No. 5,206,816 to Hill et al.

U.S. Patent No. 5,784,273 to Madhavan

U.S. Patent No. 5,774,376 to Manning

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (703) 305-4016. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703) 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0655.

Toan Le

April 4, 2003



John Barlow
Supervisory Patent Examiner
Technology Center 2800